User Manual Athena-2plus

Version 1.0

Contents Page

Product description: Athena-*2plus* 2
1.0 Installation....3
1.1 Mechanical installation....3
1.2 Connection to SCSI Bus....3
1.3 Configuring the SCSI address....3
1.4 Mode SCSI wide....3
1.5 Termination....4
1.6 Connecting to the Battery Management System....4
2.0 Operation....4
2.1 Power-up behaviour....4
2.1.1 Low Level Formatting....4
2.1.2 Data recovery....5
2.1.2.1 Manual data restoration....5
2.1.2.2 Automatic data restoration....5
2.2 Normal operation....5
2.2.1 List of supported SCSI commands....6
2.3 Data retention and data backup....7
2.3.1 Short-term data buffer....7
2.3.2 Data backup....7
2.3.2.1 Manual data backup....7
2.3.2.2 Automatic data backup in case of power failure....8
2.3.2.3 Automatic data backup in case of inactivity....8
3.0 Diagnostics and configuration....8
3.1 Diagnostics port....8
3.2 Using the diagnostics program....9
3.3 Backup Page....9
3.4 Drive Information Page....10
3.5 Format/Restore Page....10
3.6 Direct commands for the diagnostics port....11
4.0 Internal structure of the Athena-2plus....12
4.1 Controller board....12
4.2 Memory boards....12
4.3 Internal structure of the battery managing system....13
Appendix A – Technical Data, Athena-2plus....14
Appendix B – Technical Data, Battery Managing System....15
Appendix C – Jumper settings, Athena-2plus....16
Appendix D – Front and back panels, Athena-2plus and Battery Managing System....17
Appendix E – Pin allocations, Athena-2plus....19
Appendix F – Pin allocations for Backup Harddisk....21

Athena-2plus

Ladies and gentlemen,

Thank you for deciding to buy one of our products. In order to ensure perfect function and avoid problems when installing our quality German-made products, please read the entire manual and to carefully observe the following guidelines:

– Observe the general guidelines when handling components or modules which can be damaged by electrostatic charge or discharge (this applies to the products described in this manual).

– If you should encounter any problems during the installation or use of this product, please contact our service department and ask for advice. If you do not do this, your guarantee rights may be impaired.

If you have any special questions, please contact us by phone or in writing to the address below. We will be happy to help you:

Product description: Athena-2plus

The Athena-2*plus* is a high-speed SCSI-2 Fast Wide solid-state disk drive which uses DRAMs as the storage media. The data transfer rate to the SCSI host adapter is a maximum of 20 MB/s. Accordingly, the Athena-2*plus* is ideal for high-speed graphics and server applications:

Internal EDC (Error Detection and Correction) hardware detects and corrects faulty data. Since DRAM memory loses data if there is a power failure, the Athena-2*plus* system is available with an intelligent and well-tested combination of battery supply and backup hard disk which allows data to be backed up or restored to/from a hard disk. The battery management system is contained in a separate 3.5" case.

Athena-2*plus* is manufactured in a full-height 3.5” case and is available with usable storage capacities of up to 720 MB (incl. 20% ECC). Internally, the Athena-2*plus* contains a bus system with up to five slots for memory boards and a slot for the controller board. It also contains an AMD AM29C660 EDC Error Detection/Correction Chip (or equivalent). In order to increase the data transfer rate to/from the DRAM, this chip works in parallel to the memory and can automatically correct all 1 bit errors and recognise all 2 bit errors.

1.0 Installation

1.1 Mechanical installation

The Athena-2*plus* can be installed in any unused 3.5" drive bay. To simplify mounting, the threaded holes at the side correspond to those of a 3.5" standard hard disk. Since the Athena-2*plus* does not contain any moving mechanical components, it can be installed in the computer at any angle.

1.2 Connection to SCSI Bus

The Athena-2*plus* is a SCSI-2 Fast Wide device and should be connected to the SCSI bus using a 68-pin high density-SCSI connector. The Athena-2*plus* can also be connected to an 8-bit SCSI bus using an optional 8-bit SCSI adapter, although this will reduce the maximum data transfer rate to 10 MB/s.

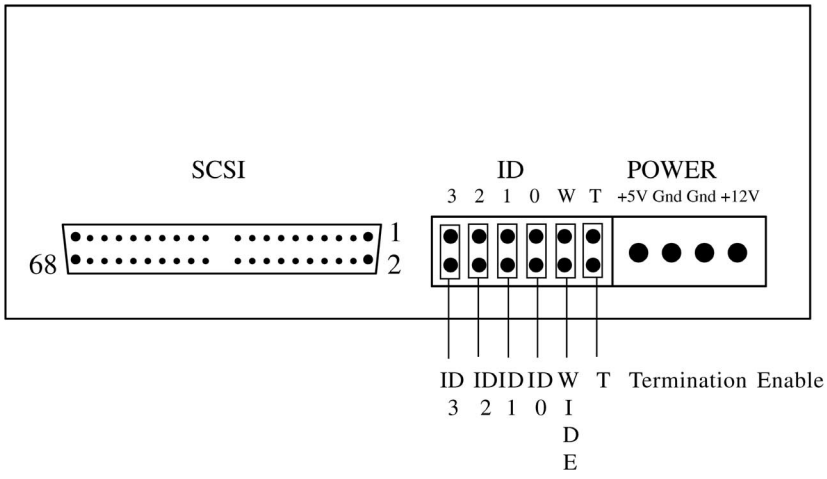
1.3 Configuring the SCSI address

Each of the maximum of 16 devices connected to the Wide SCSI Bus must have a unique SCSI address, also called SCSI ID. To avoid conflict with other SCSI devices, make sure that each device has its own unique SCSI ID. (Note: the SCSI controller itself is also a SCSI device and usually has the SCSI ID 7. The internal hard disk usually has the SCSI ID 0). The SCSI address of the Athena-2plus is configured with jumpers.

If you connect the Athena-2plus to an 8-bit SCSI bus, you must only use SCSI IDs in the range 0 to 7. See Appendix C, ‘Jumper settings’ for further details.

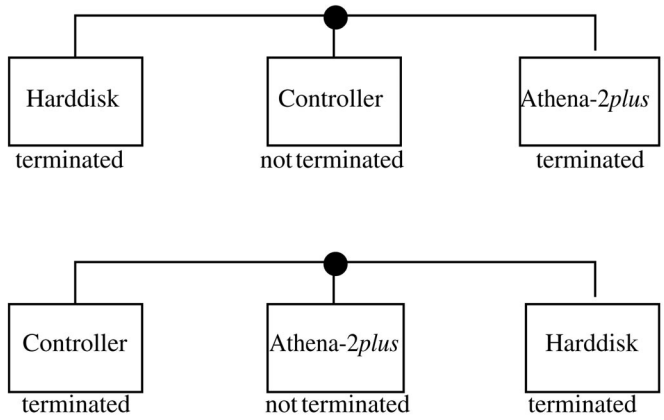
1.4 Mode SCSI wide

If the Athena-2plus should run at the 16-bit bus (mode "SCSI wide"), the jumper "wide" must be plugged, so the communication and termination can work properly. Connected to a 8-bit bus (with appropriate adapter) remove the jumper "wide".



1.5 Termination

In order to ensure correct operation of the SCSI chain even with long cable lengths, it is necessary to terminate the two SCSI devices which are located at each end of the SCSI bus. SCSI devices which are not located at each end of the SCSI bus must not be terminated.



With the Athena-2*plus*, the terminator is internal and can be enabled or disabled with jumpers. See Appendix C, 'Jumper settings' for further details.

In addition, one of the SCSI devices must provide the power supply for the termination, the so-called terminator power. The terminator power is normally supplied by the SCSI controller. If the SCSI controller or the other SCSI devices do not supply terminator power, this is detected by the Athena-2*plus*, which then activates its internal terminator power supply automatically.

1.6 Connecting to the Battery Management System

If you want to operate the Athena-2plus with the optional Battery Management System, both units must be connected by a 50 pin ribbon cable. The battery management connector for the Athena-2plus is located underneath the unit, and the matching connector on the battery management system is located at the rear (see appendix D).

2.0 Operation

2.1 Power-up behaviour

2.1.1 Low Level Formatting

In contrast to conventional, rotating hard disks with magnetic recording technology, after a power failure the Athena-2plus loses all stored data, including the partitioning and formatting information. This will result in read errors when attempting to access data areas. Accordingly, the Athena 2-plus must be reformatted after a power failure (LOW LEVEL FORMAT). Low-level

formatting can be carried out with the formatting software provided by the controller manufacturer.

However, it is often easier to carry out low level formatting with the built-in low-level formatting option of the Athena-2plus. Low level formatting of the Athena-2plus data area can be initiated manually through the diagnostics port or automatically following each cold start.

2.1.2 Data recovery

If the Athena-2plus is connected to the optional battery management system with built-in backup hard disk, data which was previously backed up from the Athena-2plus to the hard disk can be restored automatically following a power failure. This restores the entire backed-up data including partitioning and formatting information. Low-level formatting is not necessary in this case. The Athena-2plus can be used in the normal way, even while restoring data from the backup hard disk. However, the controller outputs the error message "Not ready" (or similar) if an attempt is made to access data areas of the Athena-2plus which have not yet been fully restored. Different types of controller react differently to this situation, and in some cases this can lead to further errors when trying to access the Athena-2plus. With such controllers, the computer system should not be booted until the Athena-2plus data restore function has completed.

Data can only be restored if the backup hard disk contains a valid set of backup data. The time required to restore all of the data is dependent on the capacity of the Athena-2plus and takes about 3 minutes for an installed capacity of 240 MB, which corresponds to a data transfer rate of about 1.0 MB/s.

2.1.2.1 Manual data restoration

Manual data restoration can be started at any time by sending appropriate commands to the diagnostics port.

2.1.2.2 Automatic data restoration

Automatic data restoration is initiated automatically at each system cold start provided that this option has been enabled through the diagnostics port.

2.2 Normal operation

In normal operation, the Athena-2*plus* behaves like a standard high-speed SCSI hard disk. The following section describes the supported SCSI commands.

2.2.1 List of supported SCSI commands

Change Definition	40H	S
Compare	39H	N
Copy	18H	N
Copy and Verify	3AH	N
Format Unit	04H	F
Inquiry	12H	F
Lock - Unlock cache	36H	D
Mode select	15H	S
Mode sense	1AH	S
Pre-fetch	34H	D
Read (6)	08H	F
Read (10)	28H	F
Read buffer	3CH	F
Read capacity	25H	F
Read defect data	37H	F
Read Long	3EH	F
Reassign Blocks	07H	N
Receive diagnostic results	1CH	F
Release	17H	F
Request Sense	03H	F
Reserve	16H	F
Re-zero Unit	01H	D
Search data equal	31H	N
Search data high	30H	N
Search data low	32H	N
Seek (6)	0BH	D
Seek Extended (10)	2BH	D
Send Diagnostic	1DH	F
Set Limits	33H	F
Start/Stop Unit	1BH	F
Syncronize cache	35H	D
Test Unit Ready	00H	F
Verify	2FH	F
Write (6)	0AH	F
Write Extended (10)	2AH	F
Write and Verify	2EH	F
Write Buffer	3BH	F
Write Long	3FH	F
Write Same	41H	N

F = Fully implemented
S = Not fully implemented, a few special options of this command are not supported.
D = Dummy implementation, i.e. the command is implemented but is not applicable for or relevant to the Athena-2plus
N = The command is not supported

2.3 Data retention and data backup

The Athena-2plus contains dynamic RAM chips for storing the data. DRAMs are non-volatile, i.e. they lose all stored information following power failure. In most applications this represents an unacceptable situation.

If the Athena-2plus is operated with the optional battery management system, in case of power failure the Athena-2plus is able to buffer the stored data for a short period (-> Short-term data buffer). If the battery management system is fitted with the optional built-in backup hard disk, the Athena-2plus can be configured to regularly copy all data to the backup hard disk at a configurable time period (-> Automatic data backup). When the power returns and the system is restarted, the stored data can be automatically restored to the Athena-2plus (-> Automatic data restoration).

2.3.1 Short-term data buffer

The battery management contains a rechargeable battery which allows the Athena-2plus buffer the data for a short period following failure. The maximum bridging time of the rechargeable battery is dependent on the capacity of the Athena-2plus and the current charge state of the batteries in the battery management system. The maximum bridging time of the rechargeable batteries is about 2 hours. The battery backup does not need to be configured and is activated automatically as soon as the battery management system is connected to the Athena-2plus

2.3.2 Data backup

If the battery management system is fitted with the optional built-in backup hard disk, it is possible to back up all data which is stored in the Athena-2plus, including partitioning data and formatting information.

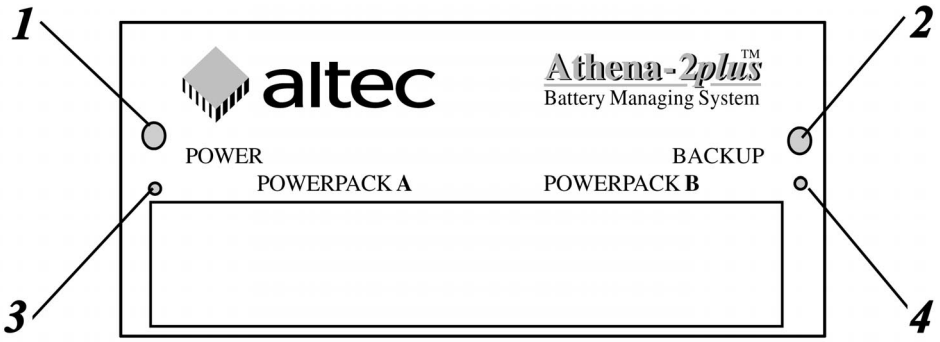
You can continue to use the Athena-2plus normally during data backup. However, please note that, in order to guarantee data integrity, data areas which have already been backed up are protected against overwriting.

The time required to back up all of the data is dependent on the capacity of the Athena-2plus and takes about 3 minutes for an installed capacity of 240 MB, which corresponds to a data transfer rate of about 1.0 MB/s.

If the data backup is prematurely interrupted, the data backup set is marked as invalid and cannot be used for data restoration. Data backup can take place manually or automatically.

2.3.2.1 Manual data backup

Manual data backup can be started at any time by sending appropriate commands to the diagnostics port, or by pressing the backup switch on the front of the battery management system.



Battery Managing System – Front view

1	Power lamp (green)	=	Main power supply is on
2	Backup lamp (red)	=	Backup or restore is currently active (this LED is controlled by the Athena-2plus unit)
3	Power button	=	Press to switch off the battery pack to standby mode (e.g. for transport or storage)
4	Backup button	=	Press to trigger a manual backup

2.3.2.2 Automatic data backup in case of power failure

If you have enabled the automatic data backup in case of power failure with the diagnostics port (option "Power Down Backup"), the Athena-2plus automatically checks the power supply status of the battery management system every 5 seconds. If a power failure is detected, an internal timer is started which starts data backup to the backup hard disk after a time delay which can be configured from the diagnostics port.

2.3.2.3 Automatic data backup in case of inactivity

Data backup can also be triggered automatically if no access to the Athena-2plus takes place for a preset time period which is configured from the diagnostics port. Possible reasons for inactivity are e.g. the computer has been switched off, has crashed, or - in cases where the Athena-2plus system is installed externally to the computer and they each have a separate mains power feed - the mains power feed to the computer has failed.

3.0 Diagnostics and configuration

3.1 Diagnostics port

The diagnostics port is used to configure the SCSI operating parameters and the data backup options of the Athena-2plus. It can also be used to interrogate information on the Athena-2plus hard drive and on the status of the battery management system. Communication take place through a TTY terminal (e.g. a PC with a terminal program). The following values must be configured for the terminal program:

Interface speed: 9600 baud
Number of data bits: 8
Number of stop bits: 1
Parity: none
Handshake: Hardware (RTS/CTS)

Furthermore, the terminal program must be configured to add a line feed to each received carriage return. Appendix E shows the pin allocation of the diagnostics port and a typical wiring plan to show how to connect it to the computer or terminal.

3.2 Using the diagnostics program

The diagnostics program displays the following menu on the screen of the PC after pressing ENTER:

```
altec Athena-2plus Diagnosis

1 = Backup Page
2 = Drive Information Page
3 = Format/Restore Page

s = Save
```

Enter the corresponding digit and press ENTER to access each of the diagnostic pages. Enter S and press ENTER to permanently store any configuration changes in the flash EPROM of the Athena-2plus.

3.3 Backup Page

This diagnostics page is used to configure the data backup options.

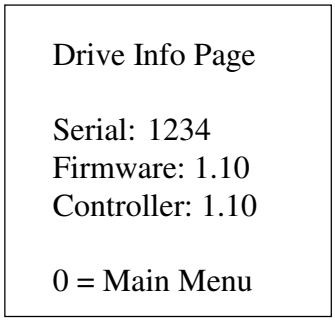
```
                Backup Page

1 = Power Down Backup:  Disabled
2 = Power Down Delay (sec):  30
3 = Inactivity Backup:  Disabled
4 = Inactivity Backup Delay (sec):  3000

5 = Power Down after Backup:  Disabled

0 = Main Menu
```

Menu '1' is used to toggle the status of the Power Down Backup Option.
Menu '2' is used to adjust the time between detection of power supply failure and the start of data backup to the hard disk, in steps of 5 seconds.

Menu '3' is used to toggle the status of the Inactivity Backup Option.
Menu '4' is used to adjust the period between SCSI Bus inactivity and the start of data backup to the hard disk, in steps of 5 seconds.
Menu '5' is used to toggle the behaviour following Power Down Backup. If 'Power Down after Backup' is enabled, the entire Athena-2plus System is switched off after completing the data backup, in order to protect the rechargeable batteries from complete discharge. Further information on the data backup options can be found in the chapter 'Automatic data backup'.
Enter '0' and press ENTER to return to the diagnostics main menu.

3.4 Drive Information Page

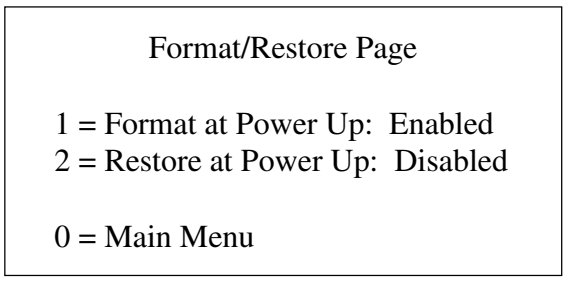
The drive information page is for information purposes only. The screen displays the serial number of the Athena-2plus, the Athena firmware version and the hardware version of the controller board:



Enter '0' and press ENTER to return to the diagnostics main menu.

3.5 Format/Restore Page

This page is used to configure the format and restore options.



Menu '1' is used to toggle the status of the automatic format Option. **Menu '2'** is used to toggle the status of the automatic data restore options. Further information on these two options can be found in the respective sections of this manual

Enter '0' and press ENTER to return to the diagnostics main menu

3.6 Direct commands for the diagnostics port

In addition to the configuration pages, direct commands can be entered on the PC's keyboard in order to trigger particular actions in the Athena-2plus or to get information. The available direct commands are as follows:

start backup: start a data backup to the backup hard disk
start restore: start a data restore from the backup hard disk
start format: format the entire data area of the Athena-2plus
power off: switch off the rechargeable battery, e.g. for transport or storage purposes

power status: If the Athena-2plus diagnostics port is in binary mode (see below): it responds to the power status command with the following byte series in HEX:

byte 0	byte 1	byte 2	byte 3	byte 4	byte 5
0x55	0xAA	0xFF	0x80	0x??	0xFF

Bytes 0-2 are the start bytes and Byte 5 is the stop byte
Byte 3 indicates that the data is a status message
Byte 4 contains the status data, as follows:

Bit 0 = 1 : The Power button has been pressed on the backup unit
Bit 1 = 1 : The Backup button has been pressed on the backup unit
Bit 2 = 1 : Mains power supply failure
Bit 4 = 1 : Battery pack A is present
Bit 5 = 1 : Battery pack B is present

All other bits are reserved and should not be evaluated.

If the Athena-2plus diagnostics port is in ASCII mode (see below): it responds to the power status command with 'OK' if the mains supply of the Athena-2plus is active. If the Athena-2plus is being supplied by the battery in the battery management unit, it responds with 'bad'.

The following additional direct commands can be entered through the diagnostics port:

echo off: Data received through the port is not echoed
echo on: Data received through the diagnostics port is echoed (default).
ascmode: Operate the diagnostics port in ASCII mode, i.e. all information is returned as readable text. The diagnostics menu is only accessible ASCII on mode
binmode: Operate the diagnostics port in binary mode (see the direct command "Power status", above) The diagnostics menu is not accessible in this mode.
packa: Displays status information for battery pack A
packb: Displays status information for battery pack B

If the diagnostics port is configured for binary mode, the following byte sequence (in hex) is returned on receiving the packa or packb command:

byte 0	byte 1	byte 2	byte 3	byte 4	byte 5
0x55	0xAA	0x91	0x??	0x??	0x??

Byte 3: Current battery capacity in %
Byte 4: Current in A: 0 = + 0.00 A
0 to 0x7F = + n x 0,0625 A
0x80 to 0xFF = – (n+1) x 0,0625 A

If the diagnostics port is configured for ASCII mode -Modus, the following string of hex data is returned on receiving the packa or packb command:

Battery status A: C = xxx% I = +/- x.xx A U = x.xx V
where:
C = xxx% = Current battery capacity in %, including ageing factor
I = +/- x.xx A = Battery charging current, whereby a negative value indicates discharge
U = x.xx V = Current battery voltage

4.0 Internal structure of the Athena-2plus

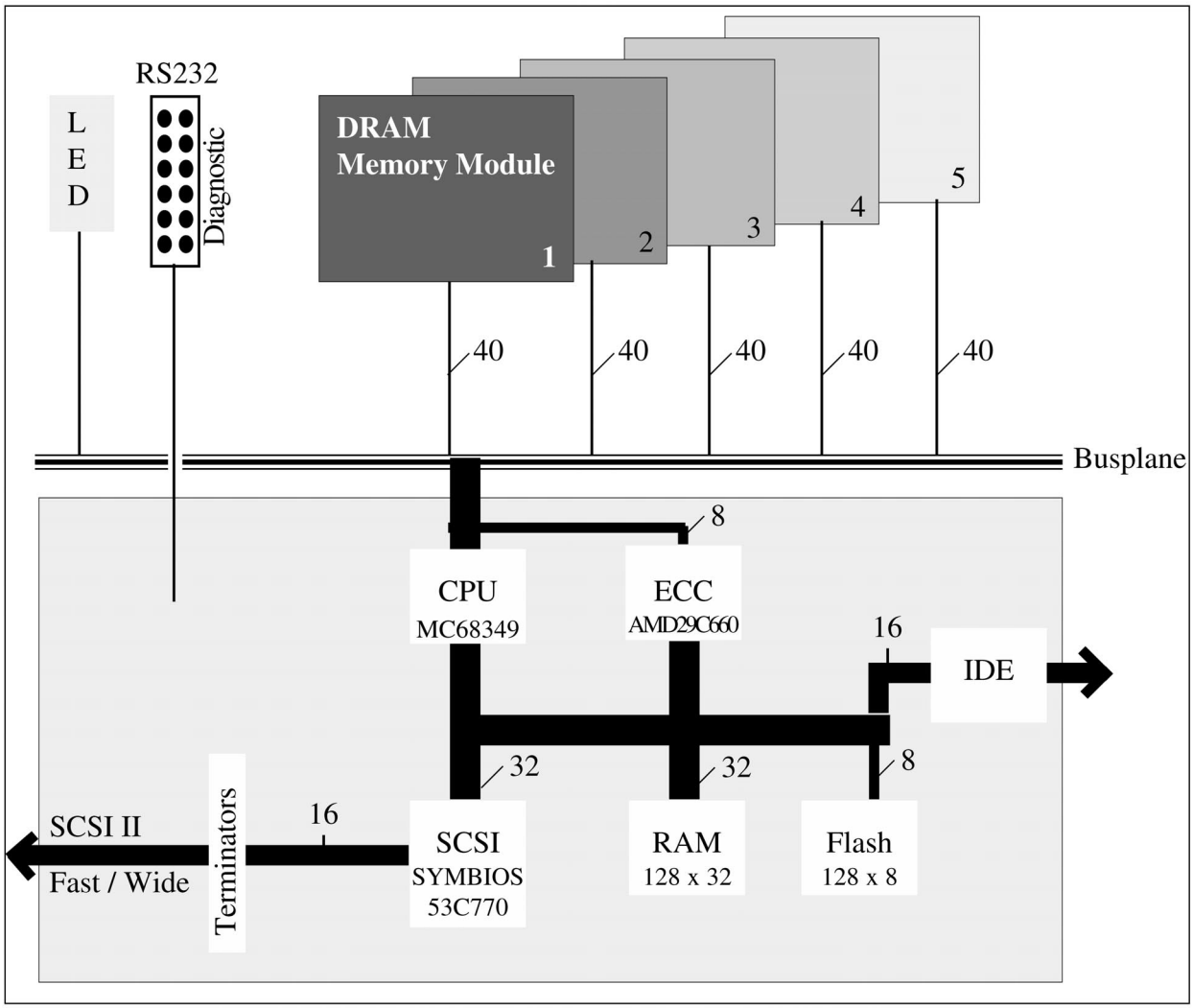
4.1 Controller board

– Motorola 32-bit MC68349 processor, 25 MHz clock frequency
– AMD 29C660 Error Detection and Correction Unit (EDC)
– NCR 53C720 Fast SCSI-2 processor
– 128 kB Flash memory, 16 kB of this for boot routine
2*32K for firmware
16 kB for parameter storage
– 128K static RAM
– Includes passive bus backplane with 5 slots for memory boards
– Serial interface with max. 19200 Baud for configuration (through diagnostics port on the front panel)
– Serial interface with max. 38400 Baud for communication with the battery backup unit
– IDE-compatible interface for the backup hard disk in the battery backup unit

Note: The last two items are connected to the 50-pin connector in the bottom plate of the Athena-2plus

4.2 Memory boards

– Max. 200 MB DRAM (gross) per memory board
– Built-in refresh logic (independent of main Athena cpu)
– 128 kB Flash memory for memory board parameter storage
– Supports DRAMs with 2K or 4K refresh



Athena-2plus – schematic diagramm of connections

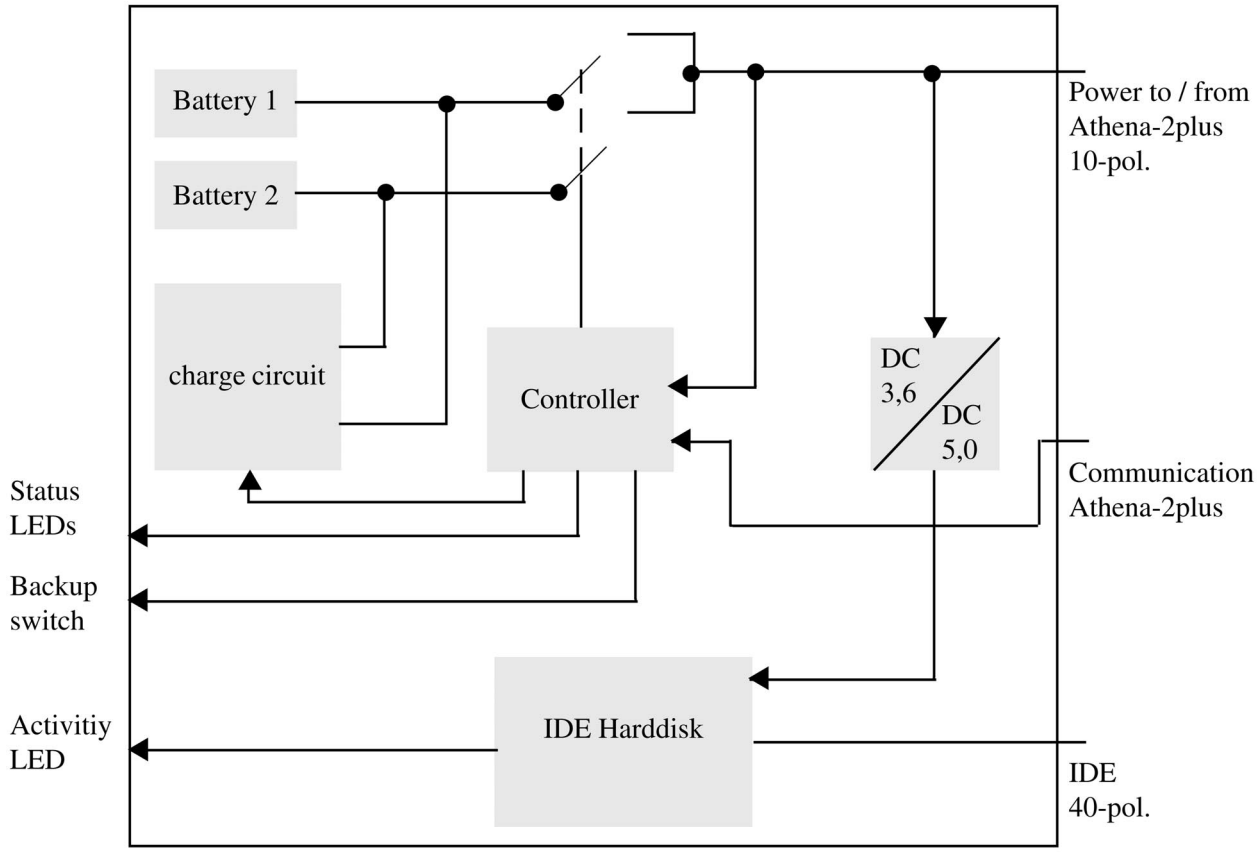
4.3 Internal structure of the battery managing system

The Battery Managing System has the following tasks:
- To supply emergency power to the Athena-2plus and for the optional built-in IDE hard disk.
- To exchange information on power status and battery status with the Athena-2plus

Physical Interfaces:
- 50 pin socket connector for the IDE Interface, the serial communication with Athena-2plus and the power supply.
- The IDE interface has the same pin allocation as the IDE interface of the IDE hard disk
- Signal allocation see appendix F

Internal structure:
- Two removable battery packs 3.6 V, capacity sufficient for 4 complete data backups
- Charging circuits for two rechargeable batteries
- Regulated DC-DC converter 3.0 - 5.0 V
- Provision for an external switch to manually trigger a backup (see "Status external" connector)

- LED indicators for
  – Mains power/drive busy
  – Backup/restore status
  – Battery status - charging or active (two LEDs on each battery pack)



Battery Managing System – schematic diagramm of connections

Appendix A – Technical Data, Athena-2plus

Environmental conditions

Temperature	Operation	0.0 C to +70.0 C
	Storage	-40.0 C to +70.0 C
Moisture	Operation	10% to 90% non condensing
	Storage	10% to 90% non condensing
Height	10,000 m above sea level	
Noise level	0 dB	
Vibration	Operation	0.01" excursion, 5-22 Hz
	Storage	0.02" double amplitude 5-62 Hz
Shock	Operation	50 G
	Storage	50 G
Note: Shock	½ sinewave pulse 11 ms duration	
Vibration	sinewave 1 octave / min	

System Power Requirements

DC input voltage	+5V +/- 5% 100 mV max. ripple (p-p)
Typical power consumption with 200 MB DRAM	TBD

System Performance

Startup time	1 sec.	
Transfer rate to host	Peak	20 MB / sec.
	Continuous	18 MB / sec. for 512 kB data transfer
Command overhead	max. 150 µs	
Internal data transfer rate from DRAM to SCSI controller	33 MB /sec.	

System Reliability and Maintenance

MTBF	100,000 hours
MTTR	20 min.
Data reliability	< 1 non-recoverable errors 10 * 10^14 bits read
Endurance	TBD
Power cycling	10 * 10^6 cycles

Dimensions

Length	146.0 mm
Width	101.6 mm
Height	43.5 mm

Appendix B – Technical Data, Battery Managing System

Environmental conditions

Temperature	Operation	0.0 C to +70.0 C
	Storage	-40.0 C to +70.0 C
Moisture	Operating	Dependent on type of optional backup hard disk
	Storage	Dependent on type of optional backup hard disk
Height	10.000 m above sea level	
Noise level	TBD	
Vibration	Operating	Dependent on type of optional backup hard disk
	Storage	Dependent on type of optional backup hard disk
Shock	Operating	Dependent on type of optional backup hard disk
	Storage	Dependent on type of optional backup hard disk
Note: Shock	½ sinewave pulse 11 ms duration	
Vibration	sinewave 1 octave / min	

System Power Requirements

DC Input Voltage	+5V +/- 5% 100 mV max. ripple (p-p)
Typical power dissipation	Dependent on type of optional backup hard disk

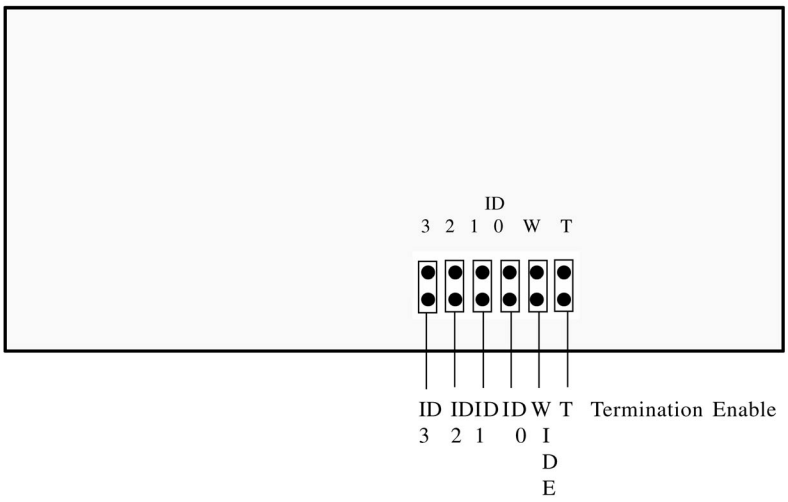
System Reliability and Maintenance

MTBF	100,000 hours
MTTR	20 min.
Battery lifetime	3 years or 1000 charging cycles
Endurance	TBD
Power cycling	10 E 6 cycles

Dimensions

Length	146.0 mm
Width	101.0 mm
Height	43.0 mm

Appendix C – Jumper settings, Athena-2plus



Athena-2plus – Jumper settings

ID	3	2	1	0
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

Meaning of jumpers

ID jumper-linked = 1
ID open = 0

W jumper-linked = 16-bit mode (wide)
W open = 8-bit mode

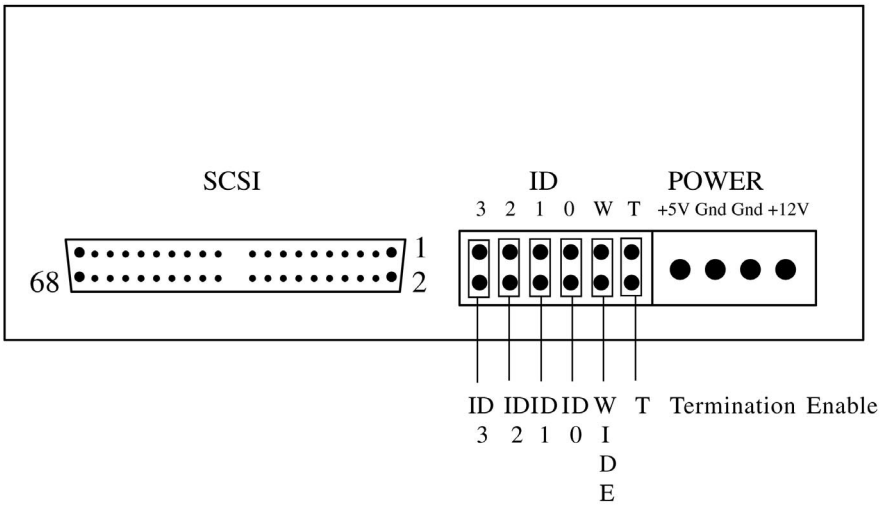
T jumper-linked = Termination on
T open = Termination off

Appendix D – Front and back panels, Athena-2plus and Battery Managing System

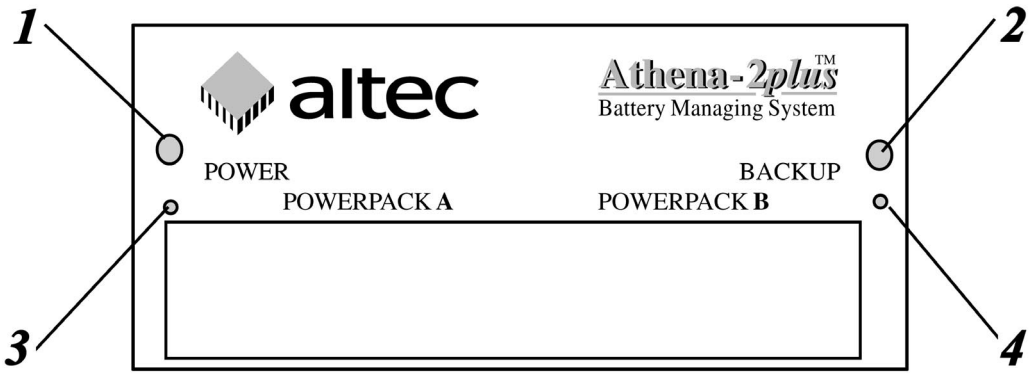
Athena-2plus – Front view

1 DIAGNOSIS = connector for diagnostics terminal
2 BUSY – green = Main power feed to Athena-2*plus* is present (should always be on)**
– red = SCSI access
3 STATUS – red blinking = backup
– green blinking = restore
– both blinking = format

** Note: If both green and red LEDs are lit, then a yellow color is visible

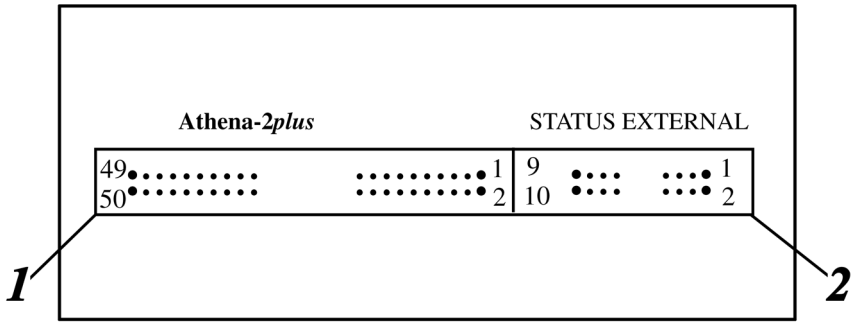


Athena-2plus – Back view



Battery Managing System – Front view

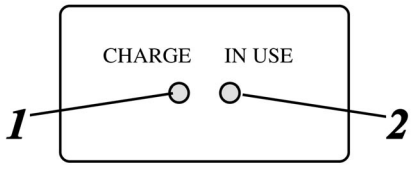
1 Power lamp (green) = Main power supply is on
2 Backup lamp (red) = Backup or restore is currently active (this LED is controlled by the Athena-2plus unit)
3 Power button = Press to switch off the battery pack to standby mode (e.g. for transport or storage)
4 Backup button = Press to trigger a manual backup



Battery Managing System – Back view

1 50-pin connector to Athena-2plus
2 STATUS EXTERNAL connector

1 LED Power	3 LED Backup activity	5 Ext. backup switch	7 Ext. power switch	9 (reserved)
2 Gnd	4 Gnd	6 Gnd	8 Gnd	10 VIDLE (reserved)



Battery Managing System – Rechargeable battery pack

1 CHARGE = Battery being charged
2 IN USE = Battery backup in use

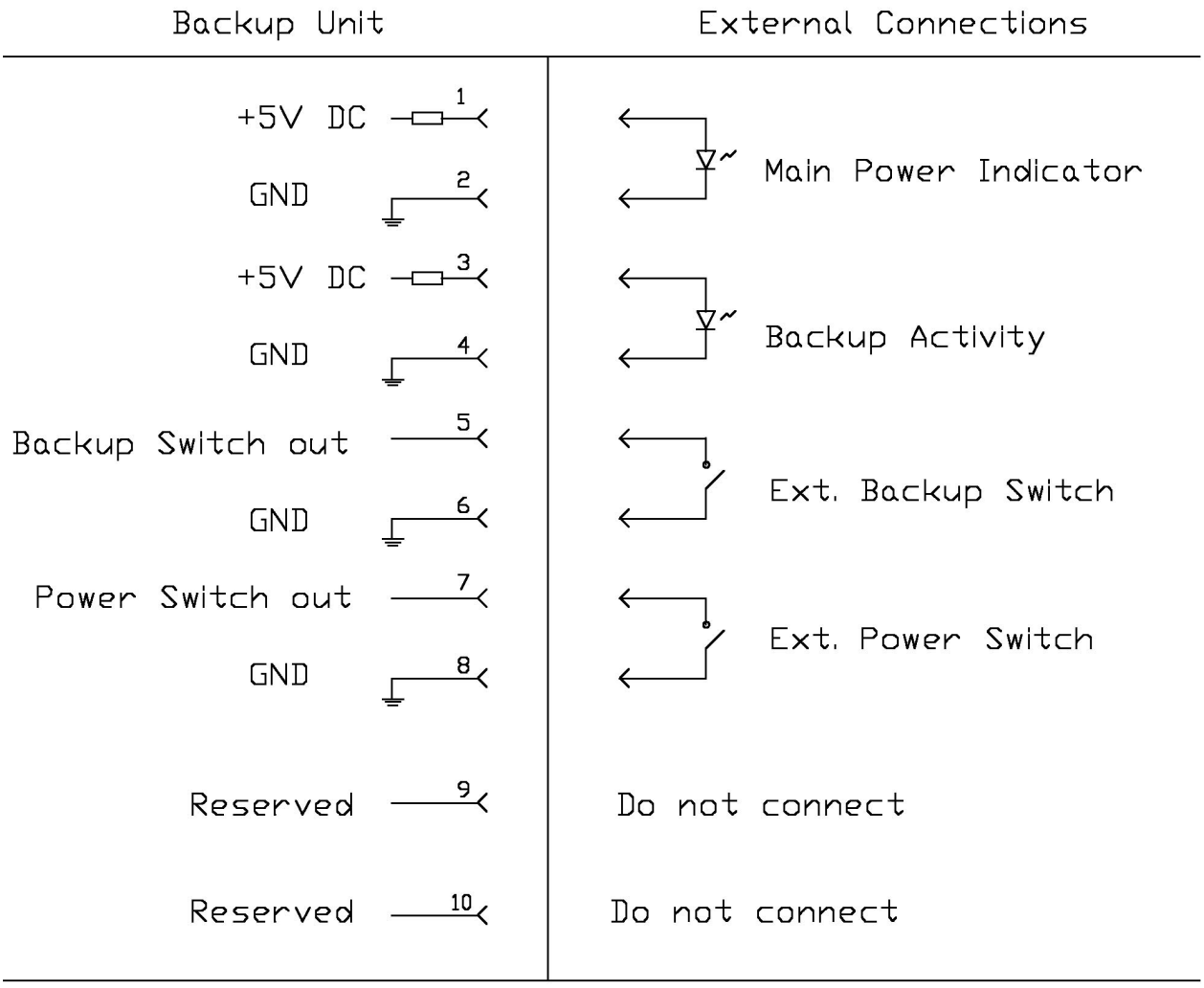
Appendix E – Pin allocations, Athena-2plus

Signal (*)	Pin No.	Signal (*)	Pin No.
-DB(12)	2	GROUND	1
-DB(13)	4	GROUND	3
-DB(14)	6	GROUND	5
-DB(15)	8	GROUND	7
-DB(P1)	10	GROUND	9
-DB(0)	12	GROUND	11
-DB(1)	14	GROUND	13
-DB(2)	16	GROUND	15
-DB(3)	18	GROUND	17
-DB(4)	20	GROUND	19
-DB(5)	22	GROUND	21
-DB(6)	24	GROUND	23
-DB(7)	26	GROUND	25
-DB(P)	28	GROUND	27
GROUND	30	GROUND	29
GROUND	32	GROUND	31
TERMPWR	34	TERPWR	33
TERMPWR	36	TERPWR	35
RESERVED	38	RESERVED	37
GROUND	40	GROUND	39
-ATN	42	GROUND	41
GROUND	44	GROUND	43
-BSY	46	GROUND	45
-ACK	48	GROUND	47
-RST	50	GROUND	49
-MSG	52	GROUND	51
-SEL	54	GROUND	53
-CD	56	GROUND	55
-REQ	58	GROUND	57
-I/O	60	GROUND	59
-DB(8)	62	GROUND	61
-DB(9)	64	GROUND	63
-DB(10)	66	GROUND	65
-DB(11)	68	GROUND	67

SCSI interface – 68 pin high-density socket connector

(*) corresponds to a low active signal

Diagnostics port – connector for diagnostics terminal – Front view



Battery Managing System – Status External connector

Appendix F – Pin allocations for Backup Harddisk

1	RESET	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	-
21	-	22	GND
23	IOWR	24	GND
25	IORD	26	GND
27	IOCHRDY	28	-
29	-	30	GND
31	INT	32	IOCS16
33	A1	34	-
35	A0	36	A2
37	CS1	38	CS3
39	ACT	40	GND
41	VCC	42	VCC
43	GND	44	GND